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Abstract

REVIEW OF ENGINEERING WORK FOR THE DRAGON PROJECT

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The 20 MW(t) Dragon reactor experiment is a graphite moderated, helium cooled, high temperature reactor now in the last stages of construction at Winfrith, Dorset, England.

Criticality is expected during the second quarter of 1964 and construction work, carried out with the participation of a large number of contractors and organisations of the different signatory countries, started in April 1960.

This paper reviews the main aspects of the engineering work through the stages of design, manufacture and site construction and testing which have all been affected to different extents by the novel features peculiar to this type of reactor, such as the use of helium as a coolant, the use of an uncanned ceramic fuel, the high coolant temperatures and the extreme compactness of the plant.

One of the requirements affecting all the components of the primary circuit is the need to meet a very high standard of leak tightness, which would be normal on laboratory scale but which is novel for a large plant. Other requirements are the need to purify the helium coolant both from fission products and from chemical impurities, as the helium must be very pure to avoid chemical reactions with the hot graphite, and the need to measure the resulting extremely low levels of impurities during reactor operation.

The use of very pure helium has meant that special care has had to be taken with the selection of materials for bearings and gears because they are not operating in an oxidising atmosphere, as is usually the case.

In general, high standards of materials and workmanship have been specified to satisfy the safety and operational requirements and to ease the site construction problems of the reactor experiment which is, by its nature and purpose, more complex than a power reactor would need to be.